

INFLATABLE VEHICLE CUP HOLDER

Related Application

This application is a divisional application of U.S. Patent Application 09/951,082 filed September 12, 2001, which is a non-provisional of U.S. Provisional Patent Application 60/231,797 filed September 11, 2000. These applications are incorporated herein by reference.

Field of the Invention

The present invention relates generally to vehicular cup holders and, more particularly, to an inflatable cup holder having a pressurized air bladder.

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Background of the Invention

A cup holder is a ubiquitous feature in a modern vehicle. A motorist often consumes varied beverages during the course of the day while commuting. A cup holder is used to stabilize beverage containers as varied as disposable cups, soft drink bottles and cans, oversized beverage cups and mugs. The conventional vehicle cup holder is merely a depressed annular region. However, an invariant annular depression is necessarily too small to accommodate large containers or affords excessive movement to undersize containers. Regardless of whether a container is too large to fit in a cup holder or so small as to slosh. However, spillage is the inevitable result. The conventional recessed annular cup holder would be greatly improved if it were adjustable without the addition of space consuming complex mechanical devices. Thus, there exists a need for a compact vehicle cup holder that is adjustable to accommodate a variety of beverage container sizes.

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Summary of the Invention

An inventive cup holder includes a shell with an inner wall defining an internal bore. The internal bore has an aperture therein. An inflatable bladder adjacent to the aperture upon pressurization, thromboses and extends to the
5 aperture into the bore to reduce internal bore size and thereby impinge upon a beverage container inserted within the internal bore. An inflation device for pressurizing the bladder is located within the shell of the cup holder. A shell outer wall can be adapted to insert within a recess.

The process for securing a beverage container includes the steps of
10 inserting a beverage container into a cup holder and includes a shell having a wall defining an internal bore and an aperture in the inner wall, an inflatable bladder adjacent to the aperture and an inflation device for pressurizing the bladder to protrude through the aperture into the internal bore. The use of a pressure bladder to reduce the diameter of the cup holder to secure a variety of
15 beverage containers is also detailed.

Brief Description of the Drawings

Figure 1 is a partial cutaway view of a cup holder according to the present invention;

Figure 2 is a top view of a console encompassing the embodiment
20 depicted in Figure 1;

Figure 3 is a top view of another embodiment according to the present invention; and

Figure 4 is still another embodiment of the present invention particularly well adapted for retrofitting the present invention into a conventional recessed annulus cup holder.

Detailed Description of the Invention

5 The cup holder 10 as shown in Figures 1 and 2 includes a rigid shell 12 defining a generally cylindrical bore 14. The rigid shell 12 is preferably formed of conventional injection moldable thermoplastic materials illustratively including polyethylene, polyamides, polycarbonates, and polyvinyls. The bore 14 is sized to accommodate an oversize beverage bottle or cup. Preferably, the
10 bore 14 has a diameter of between about 3 and 5 inches. The bore 14 has an aperture 16 along the height of the bore 14. Preferably, the aperture 16 is radial about the shell inner wall 17 defining the bore 14. The present invention is concerned with using an air pressurized bladder to protrude through the radial aperture 16 so as to grip any beverage container inserted within the bore 14
15 firmly and without inducing crushing thereof. A flexible annular bladder 18 is fit within the rigid thermoplastic shell 14 so as to be aligned with the radial aperture 16. Flexible bladder 18 is retained in the rigid shell 12 with stays 19 molded into the shell 12 or with an adhesive (not shown) illustratively including a pressure sensitive and thermal adhesive. The bladder 18 is
20 preferably made from a viscoelastic material such as rubber and preferably latex rubber. It is appreciated that other materials such as vinyl or other structural layers that are impervious to air and readily expandable are also operative herein. An inflation device 20 is integrated into the rigid shell 12.

The inflation device 20 includes a bellows that urges a charge of air through a one-way valve 24. The charge of air passing through the one-way valve 24 then enters and expands the volume of bladder 18. While a manually activated bellows is contemplated, it is appreciated that a bellows is obviated by the use of a vehicle compressed air source. Owing to the rigidity of the shell 12, inflation of the bladder 18 causes the bladder to protrude through the radial aperture 16 thereby reducing the base diameter 14. In this way, a cup or beverage container inserted within the bore 14 is brought into firm contact with the pressurized bladder 18. Preferably, the bladder 18 is fitted with a pressure release valve 26 to prevent over-inflation of the bladder 18 and the resulting crush deformation of a cup or beverage holder within the bore 14. Upon attaining a preselected pressure, the pressure release valve 26 includes a one-way valve and an air release diaphragm (not shown). Depressing the air release diaphragm bleeds air from the bladder 18 in order to disengage the bladder 18 from a cup or beverage container within the bore 14.

It is appreciated that other bladder configurations and pressurizing systems are also operative herein to inflate a bladder. For example, it is appreciated that a bladder need not exert a uniform radial external pressure on a cup within a cup holder of the present invention but rather an asymmetric force exerted on a cup by a differently shaped bladder is likewise operative herein. Additionally, an ancillary or existing vehicle air compressor is appreciated to be operative herein in order to pressurize a given bladder.

Optionally, the radial aperture 16 is covered by an elastic and puncture-resistant sheet material 32 adapted to expand under the force exerted by an inflated bladder 18. The sheet material 32 is intended to protect the bladder 18 from inadvertent puncture and further to facilitate cleaning of the cup holder
5 10. The sheet material 32 illustratively includes rubber, vinyl, and nylon.

An embodiment of the present invention depicted in Figure 3 utilizes multiple separate bladders 118 in fluid communication through a non-expandable tube 120. The elements of this embodiment are otherwise unchanged from those depicted in Figures 1 and 2 with the exception of a cut
10 116 within the cylindrical bore 14 being segmented to accommodate each of the individual bladders 118.

The embodiment of Figure 4 is particularly well adapted to insert within a conventional annular bore cup holder and thereby provide a retrofit adjustability to accommodate an array of cup or beverage container sizes. The
15 embodiment of the present invention depicted in Figure 4 is otherwise similar to that depicted in Figure 1 with the exception that the rigid shell has an outer wall adapted to engage a recess within a vehicle, such as a conventional cup holder, compartment, or cut out, and encompass a variety of containers, the container being selectively secured by inflation of a bladder against the outer
20 walls of the container. Preferably, the outer wall of the shell inserts within the depression of a conventional cup holder. More preferably, the outer wall flares to a larger diameter than the recess in order to accommodate a wider variety of beverage containers within the inventive bore.

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It is appreciated that the relative location of inventive components illustratively including the inflator device, radial cut, and pressure release valve are readily modified. These modifications are intended to fall within the scope of the present invention.